

Model GX10/GX20/GP10/GP20/GM10

**WT Communication (/E2)  
User's Manual**

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## Introduction

Thank you for purchasing the SMARTDAC+ Series GX10/GX20/GP10/GP20/GM10 (hereafter referred to as the recorder, GX, GP, or GM).

This manual explains the WT communication function of the GX, GP, and GM.

**Although the display of GX20 is used in this manual, GX10/GP10/GP20 can be operated similarly. Moreover, for the GM10, the same content can be displayed on a Web browser.**

In this manual, the GX20, GP20, and GM10 standard type and large memory type are distinguished using the following notations.

- Standard type: GX20-1/GP20-1/GM10-1
- Large memory type: GX20-2/GP20-2/GM10-2

For details on the features of the recorder and how to use it, read this manual together with the following user's manuals.

- Model GX10/GX20/GP10/GP20 Paperless Recorder First Step Guide (IM 04L51B01-02EN)
- Model GX10/GX20/GP10/GP20 Paperless Recorder User's Manual (IM 04L51B01-01EN)
- Data Acquisition System GM First Step Guide (IM 04L55B01-02EN)
- Data Acquisition System GM User's Manual (IM 04L55B01-01EN)

To ensure correct use, please read this manual thoroughly before beginning operation.

## Notes

- The contents of this manual are subject to change without prior notice as a result of continuing improvements to the instrument's performance and functions.
- Every effort has been made in the preparation of this manual to ensure the accuracy of its contents. However, should you have any questions or find any errors, please contact your nearest YOKOGAWA dealer.
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## Using Open Source Software

- The TCP/IP software of this product and the document concerning the TCP/IP software have been developed/created by YOKOGAWA based on the BSD Networking Software, Release 1 that has been licensed from University of California.

## Revisions

May 2014	1st Edition
December 2014	2nd Edition


## Recorder Versions Described in This Manual


The contents of this manual correspond to the GX/GP with release number 2 (see the STYLE S number) and style number 1 (see the STYLE H number) and the GM with release number 2 (see the STYLE S number) and style number 1 (see the STYLE H number).


Edition	Product	Explanation
1	GX/GP: Version 2.01 and later	—
2	GX/GP: Version 2.01 and later GM: Version 2.02 and later	Describes the GM.

## Conventions Used in This Manual

Unit		
	K	Denotes 1024. Example: 768K (file size)
	k	Denotes 1000.

Markings	
	<i>Improper handling or use can lead to injury to the user or damage to the instrument.</i> This symbol appears on the instrument to indicate that the user must refer to the user's manual for special instructions. The same symbol appears in the corresponding place in the user's manual to identify those instructions. In the manual, the symbol is used in conjunction with the word "WARNING" or "CAUTION."
<b>CAUTION</b>	
<b>WARNING</b>	Calls attention to actions or conditions that could cause serious or fatal injury to the user, and precautions that can be taken to prevent such occurrences.
<b>CAUTION</b>	Calls attention to actions or conditions that could cause light injury to the user or cause damage to the instrument or user's data, and precautions that can be taken to prevent such occurrences.
<b>Note</b>	Calls attention to information that is important for the proper operation of the instrument.

Reference Item	
	Reference to related operation or explanation is indicated after this mark. Example: ► section 4.1

Conventions Used in the Procedural Explanations	
<b>Bold characters</b>	Denotes key or character strings that appear on the screen. Example: <b>Volt</b>
	Indicates the character types that can be used. [A] uppercase alphabet, [a] lowercase alphabet, [#] symbol, [1] numbers
<b>Procedure</b>	Carry out the procedure according to the step numbers. All procedures are written with inexperienced users in mind; depending on the operation, not all steps need to be taken. Explanation gives information such as limitations related the procedure.
<b>Explanation</b>	
<b>Path</b>	Indicates the setup screen and explains the settings.
<b>Description</b>	

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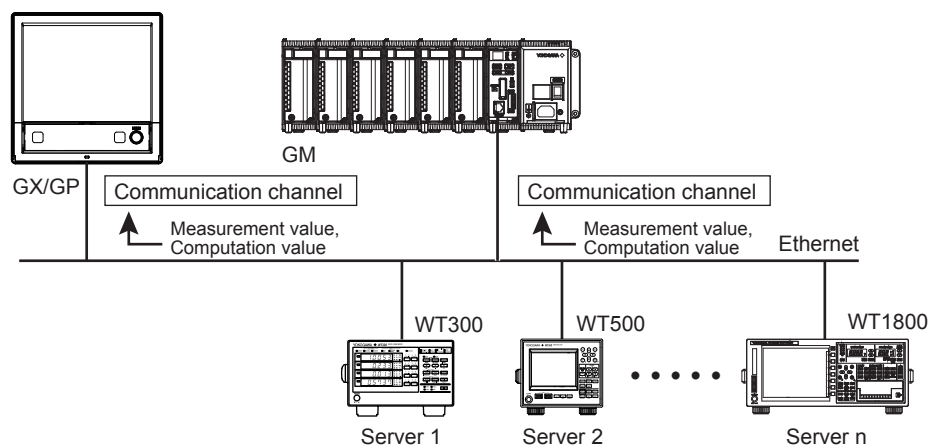
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# Using the WT Communication (/E2 option)

## Overview

The WT communication function collects values measured and computed on WT power meters and analyzers made by Yokogawa Meters & Instruments Corporation using Ethernet communication into the recorder.

The collected data can be assigned to communication channels (/MC option) and displayed and recorded simultaneously with the measured data of the recorder.



## Communication Medium

Ethernet

## Connectable Models and Options

Maker	Models	Option	Description
Yokogawa Meter & Instrument	WT310/WT330/WT332	/G5	Harmonics Measurement
		/G5	Harmonics Measurement
		/DT	Delta computation
	WT1800	/G5	Harmonic Measurement
		/G6	Simultaneous Dual Harmonic Measurement
		/DT	Delta Computation
		/MTR	Motor Evaluation Function
		/AUX	Auxiliary Sensor Inputs

## Maximum Number of Simultaneous Server Connections

Models	Maximum Number of Connections
GX10/GP10	8
GX20/GP20	16
GM10	16

## Data Collection Interval

500ms to 30s

## Procedure up to Data Collection

1. Connect WTs to the recorder using Ethernet cables.
2. Configure the WT connection client function.
  - Basic settings  
Set the WT connection client function to On.  
Set the data collection interval and recovery action.
  - Connection destination server settings  
Set the server names (IP address or host name) and the model names of the servers (WTs) that the Recorder is to connect to.
  - Assignment of collection data to communication channels  
Set the WTs that data is to be collected from, collected items, and exponential scaling of the data read from the WT.
3. Configure communication channels, recording settings, display settings, and so on.
  - Communication channel settings  
Set the span, unit, etc.
  - Recording settings  
Assign communication channels to recording channels.
  - Display settings  
Assign communication channels to display groups.
  - Other settings  
Set the watchdog timer.
4. Collect data.



# Configuring the WT connection client function

## Basic settings

### Path

GX/GP: **MENU** key > **Browse** tab > **Setting** > Setting menu **Communication (Ethernet) settings** > **WT connection client settings** > **Basic settings**  
Web browser: **Config.** tab > **Communication (Ethernet) settings** > **WT connection client basic settings**  
Hardware configurator: **Communication (Ethernet) settings** > **WT connection client basic settings**

### Description

#### WT connection client function

Setup Item	Selectable Range or Options	Default Value
On/Off	Off/On	Off

#### On/Off

Select **On** to use the WT connection client function.

#### Communication <sup>1</sup>

Setup Item	Selectable Range or Options	Default Value
Interval	500ms/1s/2s/5s/10s/20s/30s	1s

<sup>1</sup> Appears when the WT connection client function is set to **On**.

#### Interval

Set the interval to collect measured and computed data from the WTs.

#### Recovery action <sup>1</sup>

Setup Item	Selectable Range or Options	Default Value
Wait time	30s/1min/2min/5min	2min

<sup>1</sup> Appears when the WT connection client function is set to **On**.

#### Wait time

Set the communication recovery wait time when communication with a WT is interrupted. The Recorder checks the connection status at the specified interval and performs a connection procedure if the connection is disconnected.

## WT server settings

### Path

GX/GP: **MENU** key > **Browse** tab > **Setting** > Setting menu **Communication (Ethernet) settings** > **WT connection client settings** > **WT server settings**

Web browser: **Config.** tab > **Communication (Ethernet) settings** > **WT connection client server settings**

Hardware configurator: **Communication (Ethernet) settings** > **WT connection client server settings**

### Description

Setup Item	Selectable Range or Options	Default Value
Server number	GX10/GP10: 1 to 8 GX20/GP20: 1 to 16 GM10: 1 to 16	1

#### Server number

Select the connection destination server number, which specifies the target WT.

### WT server settings

Setup Item	Selectable Range or Options	Default Value
On/Off	Off/On	Off
Server name <sup>1</sup>	Character string (up to 64, <b>Aa#1</b> )	-
Model name <sup>1</sup>	WT300/WT500/WT1800	WT300

<sup>1</sup> Appears when the On/Off settings is set to **On**.

#### On/Off

Set this to **On** to connect to a WT.

#### Server name

Set the IP address or host name (when DNS is in use) of the WT to connect to.

#### Model name

Set the model name of the WT to connect to.

#### Note

////////////////////////////////////  
If the specified model is different from the actual model, data will not be collected.  
////////////////////////////////////

## Assigning WT Data to Communication Channel

### Path

GX/GP: **MENU** key > **Browse** tab > **Setting** > Setting menu **Communication (Ethernet) settings** > **WT connection client settings** > **WT data allocation settings**  
 Web browser: **Config.** tab > **Communication (Ethernet) settings** > **WT connection client data allocation settings** > Allocation No (display example: 1-20)  
 Hardware configurator: **Communication (Ethernet) settings** > **WT connection client data allocation settings** > Allocation No (display example: 1-20)

### Description

Setup Item	Selectable Range or Options	Default Value
Allocation No	GX10/GP10: 1 to 50 GX20/GP20: 1 to 300 GM10: 1 to 300	1

#### Allocation No

Specify the number to assign to the collected data.

### WT data allocation settings

Setup Item	Selectable Range or Options	Default Value
On/Off	Off/On	Off
Server No <sup>1</sup>	GX10/GP10: 1 to 8 GX20/GP20: 1 to 16 GM10: 1 to 16	1
Data group name <sup>1</sup>	<sup>3</sup>	Off
Data name <sup>2</sup>	<sup>3</sup>	-
Exponential scaling <sup>2</sup>	-9 to 18	0
Communication channel <sup>1</sup>	GX10/GP10: 1 to 50 GX20-1/GP20-1: 1 to 300 GX20-2/GP20-2: 1 to 500 GM10-1: 1 to 300 GM10-2: 1 to 500	1

- 1 Appears when the On/Off settings is set to **On**.
- 2 Appears when the data group name is not set to Off.
- 3 Refer to "Data group name and data name".

#### On/Off

Set this to **On** to collect data from the WT.

#### Note

If the **On/Off** setting is set to **Off**, data collection from the WT will be stopped.  
 In this situation, communication data will not be updated and will hold the previous value.  
 ►For the detailed operation, see "Watchdog Timer" under "Other Settings" in page 13 ,  
 "Configuring Communication Channels, Recording Settings, and Display Settings".

**Server No**

Set the connection destination server number of the server (WT) that data is to be collected from.

**Data group name**

Set the data group name of measurement function to collect.

►Refer to “Data group name and data name”.

**Note**

Data group names can be specified regardless of the number of WT elements to be connected or options. If data is read from elements or options that are not installed in the target WT, it will become NaN (Not a Number) data.

If the data group name is set to OFF, communication data will not be updated and will hold the previous value.

►For the detailed operation, see “Watchdog Timer” under “Other Settings” in page 13, “Configuring Communication Channels, Recording Settings, and Display Settings”.

**Data name**

Set the data name of measurement function to collect.

►Refer to “Data group name and data name”.

**Exponential scaling**

Set the exponent used to exponentially scale the data read from the WT using base 10.

For example, if the measured value of the WT is 123.45 kW and you specify -3, the data will be scaled by  $10^{-3}$  to derive data in unit of kW.

**Communication channel**

Set the communication channel to assign the data collected from the WT to.

**Data group name and data name****WT1800**

Data group name	Data name	Description	WT Function mark
Off	-	Data assignment is disabled.	-
ELEMENT1 to ELEMENT6	Urms	True rms voltage	Urms
	Umn	Rectified mean voltage calibrated to the rms value	Umn
	Udc	Simple voltage average	Udc
	Irms	True rms current	Irms
	Imn	Rectified mean current calibrated to the rms value	Imn
	Idc	Simple current average	Idc
	P	Active power	P
	S	Apparent power	S
	Q	Reactive power	Q
	LAMBDA	Power factor	$\lambda$
	PHI	Phase difference	$\phi$
	fU	voltage frequency	fU
	fI	current frequency	fI
	Time	Integration time	Time
	WP	sum of watt hours	WP
	WP+	Sum of positive P (consumed watt hours)	WP+
	WP-	Sum of negative P (watt hours returned to the power supply)	WP
	q	Sum of positive and negative ampere hours	q
ElemHrm1 to ElemHrm6	q+	Sum of positive I (ampere hours)	q+
	q-	Sum of negative I (ampere hours)	q-
	U(1)	RMS voltage of harmonic order 1	U(1)
	U(Total)	Rms voltage	U(Total)
	I(1)	RMS current of harmonic order 1	I(1)
	I(Total)	Rms current	I(Total)

Continued on next page

Data group name	Data name	Description	WT Function mark
ElemHrm1 to ElemHrm6	Uthd	Ratio of the total harmonic voltage to U(1) or U(Total)	Uthd
	Ithd	Ratio of the total harmonic current to I(1) or I(Total)	Ithd
SigmaA to SigmaC	Urms	True rms voltage	Urms $\Sigma$ <sup>1</sup>
	Umn	Rectified mean voltage calibrated to the rms value	Umn $\Sigma$
	Irms	True rms current	Irms $\Sigma$
	Imn	Rectified mean current calibrated to the rms value	Imn $\Sigma$
	P	Active power	P $\Sigma$
	S	Apparent power	S $\Sigma$
	LAMBDA	Power factor	$\lambda \Sigma$
	PHI	Phase difference	$\phi \Sigma$
	WP	Sum of positive and negative watt hours	WP $\Sigma$
	WP+	Sum of positive P (consumed watt hours)	WP+ $\Sigma$
	WP-	Sum of negative P (watt hours returned to the power supply)	WP- $\Sigma$
	q	Sum of positive and negative ampere hours	q $\Sigma$
	q+	Sum of positive I (ampere hours)	q+ $\Sigma$
	q-	Sum of negative I (ampere hours)	q- $\Sigma$
Other	ETA1	Efficiency 1	$\eta$ 1
	ETA2	Efficiency 2	$\eta$ 2
	ETA3	Efficiency 3	$\eta$ 3
	ETA4	Efficiency 4	$\eta$ 4
	F1	User-defined function 1	F1
	F2	User-defined function 2	F2
	F3	User-defined function 3	F3
	F4	User-defined function 4	F4
	F5	User-defined function 5	F5
	F6	User-defined function 6	F6
	F7	User-defined function 7	F7
	F8	User-defined function 8	F8
	F9	User-defined function 9	F9
	F10	User-defined function 10	F10
	F11	User-defined function 11	F11
	F12	User-defined function 12	F12
	F13	User-defined function 13	F13
	F14	User-defined function 14	F14
	F15	User-defined function 15	F15
	F16	User-defined function 16	F16
	F17	User-defined function 17	F17
	F18	User-defined function 18	F18
DeltaA to DeltaC	DELTA U1	Delta computation voltage 1	$\Delta$ U1
	DELTA U2	Delta computation voltage 2	$\Delta$ U2
	DELTA U3	Delta computation voltage 3	$\Delta$ U3
	DELTA U SIGMA	Delta computation wiring voltage	$\Delta$ U $\Sigma$
	DELTA I	Delta computation current	$\Delta$ I
	DELTA P1	Delta computation power 1	$\Delta$ P1
	DELTA P2	Delta computation power 2	$\Delta$ P2
	DELTA P3	Delta computation power 3	$\Delta$ P3
	DELTA P SIGMA	Delta computation wiring power	$\Delta$ P $\Sigma$
Motor	Speed	Motor rotating speed	Speed
	Torque	Motor torque	Torque
	SyncSP	Synchronous speed	SyncSp
	Slip	Slip (%)	Slip
	Pm	Mechanical output of the motor (mechanical power)	Pm
Aux	Aux1	Auxiliary input 1	Aux1
	Aux2	Auxiliary input 2	Aux2

1 Will become  $\Sigma$ A,  $\Sigma$ B, or  $\Sigma$ C depending on the WT1800 wiring type.

### WT500

Data group name	Data name	Description	WT Function mark
Off	–	Data assignment is disabled.	–
ELEMENT to ELEMENT3	Urms	True rms voltage	Urms
	Umn	Rectified mean voltage calibrated to the rms value	Umn
	Udc	Simple voltage average	Udc
	Urmn	Rectified mean voltage	Urmn
	Uac	AC component	Uac
	Irms	True rms current	Irms
	Imn	Rectified mean current calibrated to the rms value	Imn
	Idc	Simple current average	Idc
	Irmn	Rectified mean current	Irmn
	Iac	AC component	Iac
	P	Active power	P
	S	Apparent power	S
	Q	Reactive power	Q
	LAMBDA	Power factor	$\lambda$
	PHI	Phase difference	$\varphi$
	fU	Voltage frequency	fU
	fI	Current frequency	fI
	U+pk	Maximum voltage	U+pk
	U–pk	Minimum voltage	U–pk
	I+pk	Maximum current	I+pk
	I–pk	Minimum current	I–pk
	CfU	Voltage crest factor	CfU
	CfI	Current crest factor	CfI
	Time	Integration time	Time
	WP	Sum of positive and negative watt hours	WP
	WP+	Sum of positive P (consumed watt hours)	WP+
	WP–	Sum of negative P (watt hours returned to the power supply)	WP
	q	Sum of positive and negative ampere hours	q
	q+	Sum of positive I (ampere hours)	q+
	q–	Sum of negative I (ampere hours)	q–
	WS	Volt-ampere hours	WS
	WQ	Var hours	WQ
ElemHrm1 to ElemHrm3	U(dc)	Rms voltage of harmonic order 0	U(0)
	U(1)	Rms voltage of harmonic order 1	U(1)
	U(Total)	Rms voltage	U(Total)
	I(dc)	Rms current of harmonic order 0	I(0)
	I(1)	Rms current of harmonic order 1	I(1)
	I(Total)	Rms current	I(Total)
	P(dc)	Active power of harmonic order 0	P(0)
	P(1)	Active power of harmonic order 1	P(1)
	P(Total)	Active power	P(Total)
	S(dc)	Apparent power of harmonic order 0	S(0)
	S(1)	Apparent power of harmonic order 1	S(1)
	S(Total)	Total apparent power	S(Total)
	Q(dc)	Reactive power of harmonic order 0	Q(0)
	Q(1)	Reactive power of harmonic order 1	Q(1)
	Q(Total)	Total reactive power	Q(Total)
	LAMBDA(dc)	Power factor of harmonic order 0	$\lambda$ (0)
	LAMBDA(1)	Power factor of harmonic order 1	$\lambda$ (1)
	LAMBDA(Total)	Total power factor	$\lambda$ (Total)
	PHI(1)	Phase difference between the voltage and current of harmonic order 1	$\varphi$ (1)
	PHI(Total)	Total phase difference	$\varphi$ (Total)
	PHI U(3)	Phase difference between harmonic voltage U(3) and the fundamental signal U(1).	$\varphi$ U(3)
	PHI I(3)	Phase difference between harmonic current I(3) and the fundamental signal I(1).	$\varphi$ I(3)

Continued on next page

Data group name	Data name	Description	WT Function mark
IemHrm1 to ElemHrm3	Uthd	Ratio of the total harmonic voltage to U(1) or U(Total)	Uthd
	Ithd	Ratio of the total harmonic current to I(1) or I(Total)	Ithd
	Pthd	Ratio of the total harmonic active power to P(1) or P(Total)	Pthd
SigmaA	Urms	True rms voltage	Urms $\Sigma$
	Umn	Rectified mean voltage calibrated to the rms value	Umn $\Sigma$
	Udc	Simple voltage average	Udc $\Sigma$
	Urmn	Rectified mean voltage	Urmn $\Sigma$
	Uac	AC component	Uac $\Sigma$
	Irms	True rms current	Irms $\Sigma$
	Imn	Rectified mean current calibrated to the rms value	Imn $\Sigma$
	Idc	Simple current average	Idc $\Sigma$
	Irmn	Rectified mean current	Irmn $\Sigma$
	Iac	AC component	Iac $\Sigma$
	P	Active power	P $\Sigma$
	S	Apparent power	S $\Sigma$
	Q	Reactive power	Q $\Sigma$
	LAMBDA	Power factor	$\lambda \Sigma$
	PHI	Phase difference	$\phi \Sigma$
	WP	Sum of positive and negative watt hours	WP $\Sigma$
	WP+	Sum of positive P (consumed watt hours)	WP+ $\Sigma$
	WP-	Sum of negative P (watt hours returned to the power supply)	WP- $\Sigma$
	q	Sum of positive and negative ampere hours	q $\Sigma$
	q+	Sum of positive I (ampere hours)	q+ $\Sigma$
	q-	Sum of negative I (ampere hours)	q- $\Sigma$
Other	WS	Integrated value of S $\Sigma$	WS $\Sigma$
	WQ	Integrated value of Q $\Sigma$	WQ $\Sigma$
	ETA1	Efficiency 1	$\eta$ 1
	ETA2	Efficiency 2	$\eta$ 2
	F1	User-defined function 1	F1
	F2	User-defined function 2	F2
	F3	User-defined function 3	F3
	F4	User-defined function 4	F4
Delta	F5	User-defined function 5	F5
	F6	User-defined function 6	F6
	F7	User-defined function 7	F7
	F8	User-defined function 8	F8
Delta	DELTA F1	Delta computation 1	$\Delta$ F1
	DELTA F2	Delta computation 2	$\Delta$ F2
	DELTA F3	Delta computation 3	$\Delta$ F3
	DELTA F4	Delta computation 4	$\Delta$ F4
Phase	PHI U1-U2	The phase difference between the fundamental voltage of element 1, U1(1), and the fundamental voltage of element 2, U2(1)	$\phi$ U1-U2
	PHI U1-U3	The phase difference between the fundamental voltage of element 1, U1(1), and the fundamental voltage of element 3, U3(1)	$\phi$ U1-U3
	PHI U1-I1	The phase difference between the fundamental voltage of element 1, U1(1), and the fundamental current of element 1, I1(1)	$\phi$ U1-I1
Phase	PHI U1-I2	The phase difference between the fundamental voltage of element 1, U1(1), and the fundamental current of element 2, I2(1)	$\phi$ U1-I2
	PHI U1-I3	The phase difference between the fundamental voltage of element 1, U1(1), and the fundamental current of element 3, I3(1)	$\phi$ U1-I3

### WT300

Data group name	Data name	Description	WT Function mark
Off	–	Data assignment is disabled.	–
ELEMENT1 to ELEMENT3	U	voltage	U
	I	current	I
	P	active power	P
	S	apparent power	S
	Q	reactive power	Q
	LAMBDA	power factor	$\lambda$
	PHI	phase difference	$\phi$
	fU	voltage frequency	fU
	fI	current frequency	fI
	U+pk	Maximum voltage	U+pk
	U–pk	Minimum voltage	U–pk
	I+pk	Maximum current	I+pk
	I–pk	Minimum current	I–pk
	P+pk	Maximum active power	P+pk
	P–pk	Minimum active power	P–pk
	Time <sup>1</sup>	Integration time	Time
	WP	sum of watt hours	WP
	WP+	Sum of positive P (consumed watt hours)	WP+
	WP–	Sum of negative P (watt hours returned to the power supply)	WP
	q	Sum of positive and negative ampere hours	q
	q+	Sum of positive I (ampere hours)	q+
	q–	Sum of negative I (ampere hours)	q–
ElemHrm1 to ElemHrm3	U(1)	RMS voltage of harmonic order 1	U(1)
	U(Total)	Rms voltage	U(Total)
	I(1)	RMS current of harmonic order 1	I(1)
	I(Total)	Rms current	I(Total)
	P(1)	Active power of harmonic order 1	P(1)
	P(Total)	Active power	P(Total)
	LAMBDA(1)	Power factor of harmonic order 1	$\lambda$ (1)
	PHI(1)	Phase difference between the voltage and current of harmonic order 1	$\phi$ (1)
	PHI U(3)	Phase difference between harmonic voltage U(3) and the fundamental signal U(1).	$\phi$ U(3)
	PHI I(3)	Phase difference between harmonic current I(3) and the fundamental signal I(1).	$\phi$ I(3)
	Uthd	Ratio of the total harmonic voltage to U(1) or U(Total)	Uthd
	Ithd	Ratio of the total harmonic current to I(1) or I(Total)	Ithd
	Uhdf(1)	relative harmonic content of harmonic voltage of order 1	Uhdf(1)
	Ihdf(1)	relative harmonic content of harmonic current of order 1	Ihdf(1)
	Phdf(1)	relative harmonic content of harmonic power of order 1	Phdf(1)
	FPLL <sup>2</sup>	Current frequency or voltage frequency of PLL source	fPLL
SigmaA	U	voltage	U $\Sigma$
	I	current	I $\Sigma$
	P	active power	P $\Sigma$
	S	apparent power	S $\Sigma$
	Q	reactive power	Q $\Sigma$
	LAMBDA	power factor	$\lambda \Sigma$
	PHI	phase difference	$\phi \Sigma$
	WP	Sum of positive and negative watt hours	WP $\Sigma$
	WP+	Sum of positive P (consumed watt hours)	WP+ $\Sigma$
	WP–	Sum of negative P (watt hours returned to the power supply)	WP– $\Sigma$

Continued on next page



Data group name	Data name	Description	WT Function mark
SigmaA	q	Sum of positive and negative ampere hours	q $\Sigma$
	q+	Sum of positive I (ampere hours)	q+ $\Sigma$
	Q-	Sum of negative I (ampere hours)	q- $\Sigma$
Other	MATH	Computed value, such as efficiency	Math

1 "Time" is valid only when the data group is ELEMENT1.

2 "FPLL" is valid only when the data group is ElemHrm1.

### Valid Data Groups Based on the WT Specifications

Data group names can be specified regardless of the number of WT elements to be connected or options. If data is read from elements or options that are not installed in the target WT, it will become NaN (Not a Number) data.

The following table shows the valid group names depending on the number of WT elements and option specifications.

#### WT1800

Number of element	Option code	Data group name					
1	-	Element1					
	/G5, /G6	ElemHrm1					
	-	Other					
	/MTR	Motor					
	/AUX	Aux					
2	-	Element1	Element2				
	/G5, /G6	ElemHrm1	ElemHrm2				
	-	SigmaA					
	/DT	DeltaA					
	-	Other					
	/MTR	Motor					
	/AUX	Aux					
3	-	Element1	Element2	Element3			
	/G5, /G6	ElemHrm1	ElemHrm2	ElemHrm3			
	-	SigmaA					
	/DT	DeltaA					
	-	Other					
	/MTR	Motor					
	/AUX	Aux					
4	-	Element1	Element2	Element3	Element4		
	/G5, /G6	ElemHrm1	ElemHrm2	ElemHrm3	ElemHrm4		
	-	SigmaA	SigmaB				
	/DT	DeltaA	DeltaB				
	-	Other					
	/MTR	Motor					
	/AUX	Aux					
5	-	Element1	Element2	Element3	Element4	Element5	
	/G5, /G6	ElemHrm1	ElemHrm2	ElemHrm3	ElemHrm4	ElemHrm5	
	-	SigmaA	SigmaB				
	/DT	DeltaA	DeltaB				
	-	Other					
	/MTR	Motor					
	/AUX	Aux					
6	-	Element1	Element2	Element3	Element4	Element5	Element6
	/G5, /G6	ElemHrm1	ElemHrm2	ElemHrm3	ElemHrm4	ElemHrm5	ElemHrm6
	-	SigmaA	SigmaB	SigmaC			
	/DT	DeltaA	DeltaB	DeltaC			
	-	Other					
	/MTR	Motor					
	/AUX	Aux					

**WT500**

Number of element	Option code	Data group name		
1	-	Element1		
	/G5	ElemHrm1		
	-	Other		
	/DT	Delta		
	/G5	Phase		
2	-	Element1	Element2	
	/G5	ElemHrm1	ElemHrm2	
	-	SigmaA		
	-	Other		
	/DT	Delta		
	/G5	Phase		
3	-	Element1	Element2	Element3
	/G5	ElemHrm1	ElemHrm2	ElemHrm3
	-	SigmaA		
	-	Other		
	/DT	Delta		
	/G5	Phase		

**WT300**

Number of element	Option code	Data group name		
1	-	Element1		
	/G5	ElemHrm1		
	-	Other		
2	-	Element1		Element3
	/G5	ElemHrm1		ElemHrm3
	-	SigmaA		
	-	Other		
3	-	Element1	Element2	Element3
	/G5	ElemHrm1	ElemHrm2	ElemHrm3
	-	SigmaA		
	-	Other		

**Collected Data**

- Data is collected from all specified WTs.  
WT data that cannot keep up with the read cycle will take on the previous value. In this situation, a data dropout icon appears in the status display. (►See page 14 , “Monitoring the WT Collection Status”)
- If data cannot be collected from a WT, the previous value will be held. ►For the detailed operation, see “Watchdog Timer” under “Other Settings” in page 13 , “Configuring Communication Channels, Recording Settings, and Display Settings”.
- If multiple functions are assigned to a single communication channel, the function with the largest assignment number takes precedence.  
In addition, if data input through another communication protocol, such as Modbus client or master, uses the same channel, the channel will take on values that are retrieved according to the communication protocol's data update interval.  
Do not assign input from other communication protocols, such as Modbus communication or general communication, to communication channels that WT data is assigned to.

**Error Data Handling**

Error Data	Communication Channel Value	GX/GP digital display
Data missing	NaN(0x7fc00000)	*****
Over range	9.9E+37	+Over
Over flow		
Over data		

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# Configuring Communication Channels, Recording Settings, and Display Settings

## Communication channel settings

Set the communication channel to assign the data collected from the WT to.

► See section 1.15, “Setting Communication Channels (/MC option),” in the User’s Manual (IM 04L51B01-01EN) or section 2.16, “Setting Communication Channels (/MC option),” in the User’s Manual (IM 04L55B01-01EN).

## Recording settings

Assign communication channels to recording channels.

► For details on setting recording channels, see section 1.8.2, “Setting Recording Channels,” in the User’s Manual (IM 04L51B01-01EN) or section 2.9.2, “Setting Recording Channels,” in the User’s Manual (IM 04L55B01-01EN).

## Display settings

Assign communication channels to display groups.

► See section 1.6.2, “Setting Display Groups,” in the User’s Manual (IM 04L51B01-01EN) or section 2.7.2, “Setting Display Groups,” in the User’s Manual (IM 04L55B01-01EN).

## Other settings

### Watchdog timer

The watchdog timer function replaces values with their preset values or last values and when values are not updated within the specified duration (timer) . Set the watchdog timer so that communication interruptions caused by communication errors can be detected.

► See section 1.15, “Setting Communication Channels (/MC option),” in the User’s Manual (IM 04L51B01-01EN) or section 2.16, “Setting Communication Channels (/MC option),” in the User’s Manual (IM 04L55B01-01EN).

### Status Output

On a GX/GP, notification can be sent when there is a WT communication error due to a communication error with the status relay (/FL option).

► See section 1.18.6, “Setting the FAIL Relay and Instrument Information Output (/FL option),” in the User’s Manual (IM 04L51B01-01EN) .

On a GM, you can use the event action function to send a notification when there is a WT communication error.

► See section 2.15, “Configuring the Event Action Function,” in the User’s Manual (IM 04L55B01-01EN).

# Monitoring the WT Collection Status

You can check the status of the communication with the WT.

## Procedure

### GX/GP Main Unit

1. Press **MENU**.  
The menu screen appears.
2. Tap the **Browse** tab and then **WT Client**.  
The connection status is displayed.

Scroll

The screenshot shows the 'WT client' interface. At the top, there's a header with 'WT client', a date/time '2014/04/28 17:46:59', and an 'EVENT' button. Below this is a control bar with 'UP', 'DOWN', 'Read cycle :1s', and 'Auto recovery :30s'. The main area is a table with columns: NO, Status, Server name, Model, and Elements. The first row is highlighted in blue and contains: 1, VALID, 192.168.0.2, WT300, and 3. To the right of the table is a 'WT communication information' dialog box. It has a close button (X) and contains the following data: NO: 1, Status: VALID, Server name: 192.168.0.2, Model: WT300, Elements: 3, and Option: /G5. Red lines connect the table headers to the dialog box fields: 'NO' to 'NO', 'Status' to 'Status', 'Server name' to 'Server name', 'Model' to 'Model', and 'Elements' to 'Elements'. A red line also connects the 'WT communication information' label to the dialog box. A blue double-headed arrow points to the table with the text 'Drag or flick to scroll'. A yellow warning icon is visible in the top right corner of the table area, with a red line pointing to it and the text 'Data Dropout Icon Indication Tapping the data dropout icon (ACK) clears the indication.'

NO	Status	Server name	Model	Elements
1	VALID	192.168.0.2	WT300	3

WT communication information

NO	1
Status	VALID
Server name	192.168.0.2
Model	WT300
Elements	3
Option	/G5

WT communication information

Drag or flick to scroll

Number of elements

Model name

Server name

Communication status




3. Tap an item to display the WT communication information.  
The number of elements and options are displayed when connection is established.

### Operation complete

### Data Dropout Icon Indication

If data cannot be connected from a WT within the read cycle, a data dropout icon appears. Tapping the data dropout icon (ACK) clears the indication.

## Details

Status		Detail	Description	Cause of the Error and Corrective Action
(Blank)	WT is not registered.	(Blank)	When connection to the WT has not yet been attempted.	—
Blue 	Normal communication.	VALID	Communicating normally.	—
Orange 	TCP connection in progress.	CONNECTING	Attempting to connect to the WT.	—
		CONNECTED	Connection has been established, and the WT is waiting for measurement commands.	—
Red 	Failed to connect to the WT. Waiting for auto recovery.	HOSTPORT	Unresolved host name. (During port map)	Unresolved DNS. Check the DNS settings.
		HOSTOPEN	Unresolved host name. (During VXI open)	
		CNCTPORT	Unable to connect to the server. (During port map)	Unable to connect to the server (WT). Check the network settings and the server IP address.
		CNCTOPEN	Unable to connect to the server. (During VXI open)	
		COMMPORT	TCP/IP communication error. (During port map)	Communication error. Network error. WT down, etc.
		COMMOPEN	TCP/IP communication error. (During VXI open)	
		COMMCONF	TCP/IP communication error. (During WT configuration.)	
		COMMDATA	TCP/IP communication error. (During data Collection)	
		IDN	Device information error from the WT.	The specified model is not correct.
		PROTOPORT	RPC,VXI protocol error. (During port map)	Error while processing connection. Does not occur in normal situations. A problem on the WT side.
		PROTOOPEN	RPC,VXI protocol error. (During VXI open)	
		PROTOCONF	RPC,VXI protocol error. (During WT configuration.)	
		PROTODATA	RPC,VXI protocol error. (During data Collection)	
		ITEMSET	WT data set (number of items) error.	
		NUMSET	WT data quantity (number of outputs) set error.	
		FORMSET	WT data format set error.	
		NUM	The number of data values from the WT is not appropriate.	

Web Browser

On the Web browser, click **WT Client** on the **Data** tab. A communication status screen will appear.

Click a title to sort the items in its ascending or descending order.  
An ascending or descending order mark appears.

Data dropout icon  
Click to clear it.

Type: WT client						
Read cycle: 1s		Auto recovery: 2min				
NO	Status	Detail	Server name ▲	Model	Elements	Option
1	✖ HALT	HOSTPORT	WT1800	WT1800		

Scroll bar

Option

Number of elements

Model name

Server name

Communication status

The screenshot shows a web browser interface for monitoring WT Client status. At the top, there are tabs for 'Divide', 'Register', 'Display format', 'Message', and 'Pause/Resume'. Below these, a header bar indicates 'Type: WT client' and shows 'Read cycle: 1s' and 'Auto recovery: 2min'. The main area is a table with columns: NO, Status, Detail, Server name, Model, Elements, and Option. The first row shows '1' in the NO column, '✖ HALT' in the Status column, 'HOSTPORT' in the Detail column, 'WT1800' in the Server name column, 'WT1800' in the Model column, and empty cells for Elements and Option. Annotations with red lines point to various UI elements: 'Click a title to sort the items in its ascending or descending order. An ascending or descending order mark appears.' points to the 'Server name' column header. 'Data dropout icon Click to clear it.' points to a yellow triangle icon in the top right. 'Scroll bar' points to the vertical scrollbar on the right. 'Option' points to the 'Option' column header. 'Number of elements' points to the 'Elements' column header. 'Model name' points to the 'Model' column header. 'Server name' points to the 'Server name' column header. 'Communication status' points to the 'Status' column header.